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Kawaguchi et al.

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(54) **AUXILIARY TABLE FOR SEWING MACHINE**

(75) Inventors: **Yasuhiko Kawaguchi**, Nagoya (JP); **Junnosuke Matsuda**, Nagoya (JP); **Takahira Osamura**, Kitanagoya (JP)

(73) Assignee: **Brother Kogyo Kabushiki Kaisha**, Nagoya (JP)

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D05B 75/06 (2006.01)

(52) **U.S. Cl.** **112/217.1**

(58) **Field of Classification Search** 112/217.1, 112/103, 136, 217.2, 470.13, 470.14, 470.18, 112/102.5, 101
See application file for complete search history.

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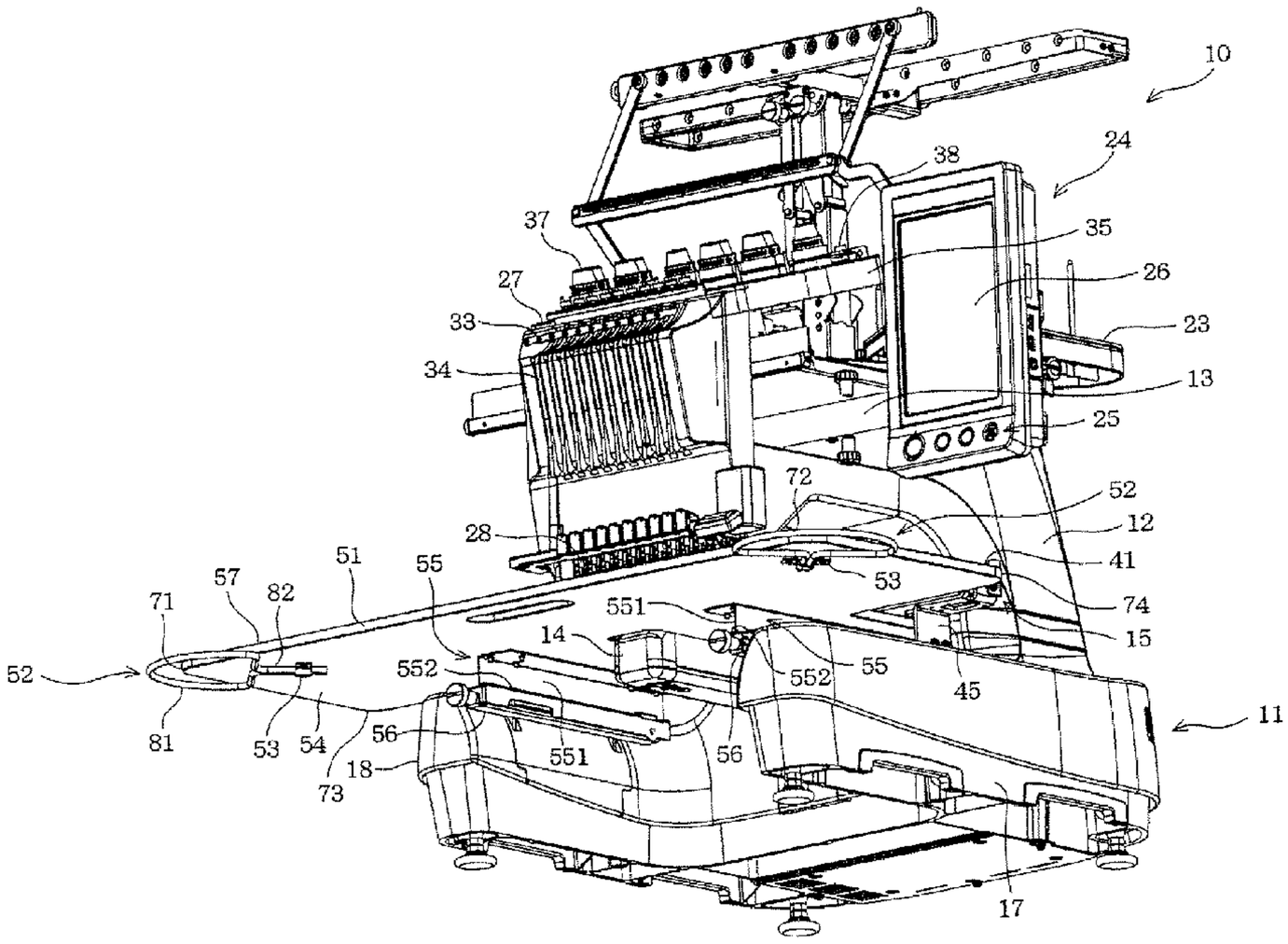
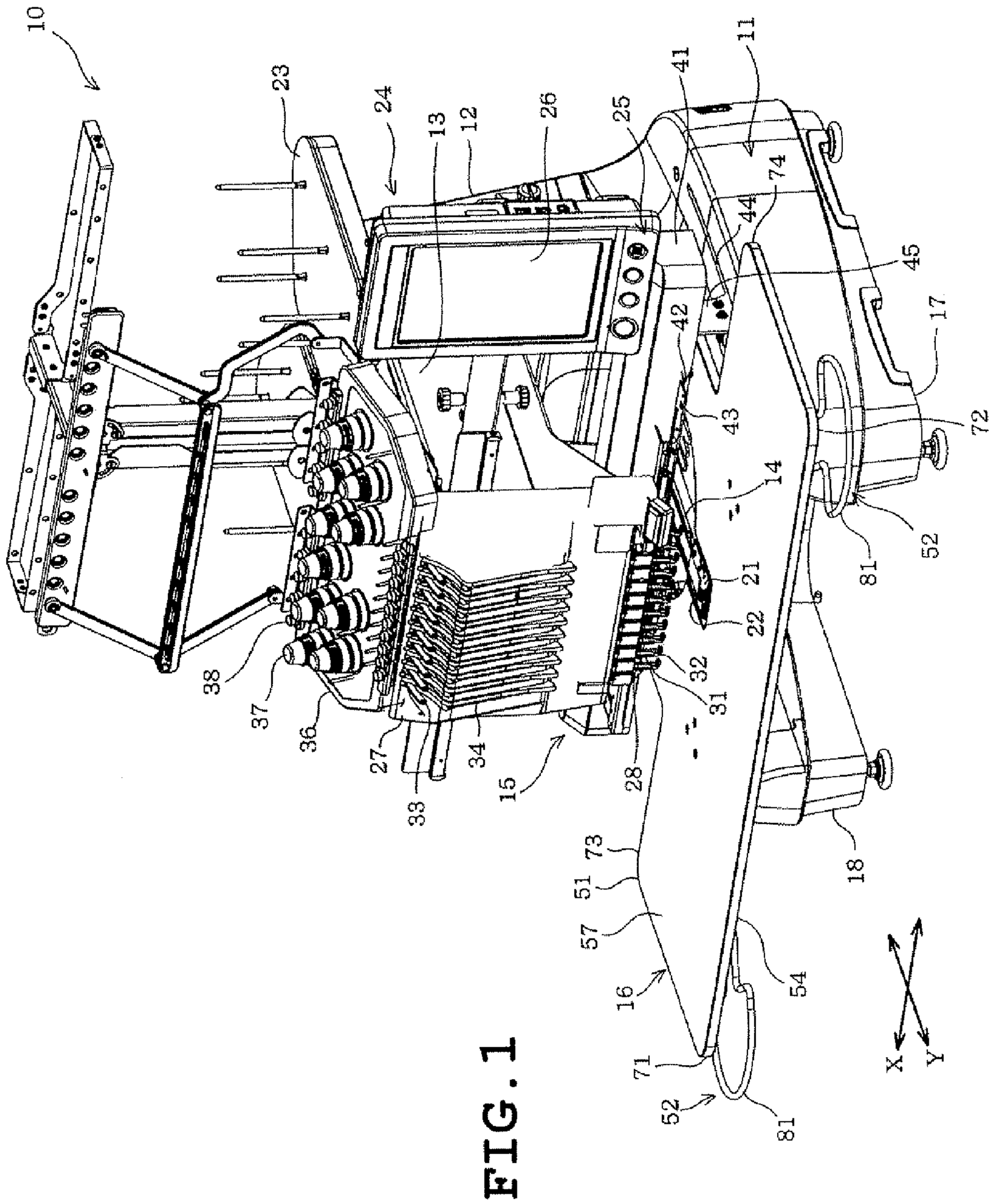
Primary Examiner — Tejash Patel
(74) *Attorney, Agent, or Firm* — Oliff & Berridge, PLC

(57) **ABSTRACT**

An auxiliary table for a sewing machine includes a table body formed into a flat plate shape and including one or more rectangular portions, the table body having corners, an upper surface at an upper side in a direction of gravitational force and an underside at a lower side in the direction of gravitational force, a cloth-receiving member disposed on at least one corner of the table body so as to be located lower than the upper surface of the table body and configured to support the workpiece cloth when it is placed on the upper surface side of the table body and hanging downward from the table body, the cloth-receiving member having a receiving portion having an outer edge surrounding outer edges of the corners, and a supporting member supporting the cloth-receiving member so protrusion of the cloth-receiving member from an outer edge of the table body is changeable.

13 Claims, 9 Drawing Sheets

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54
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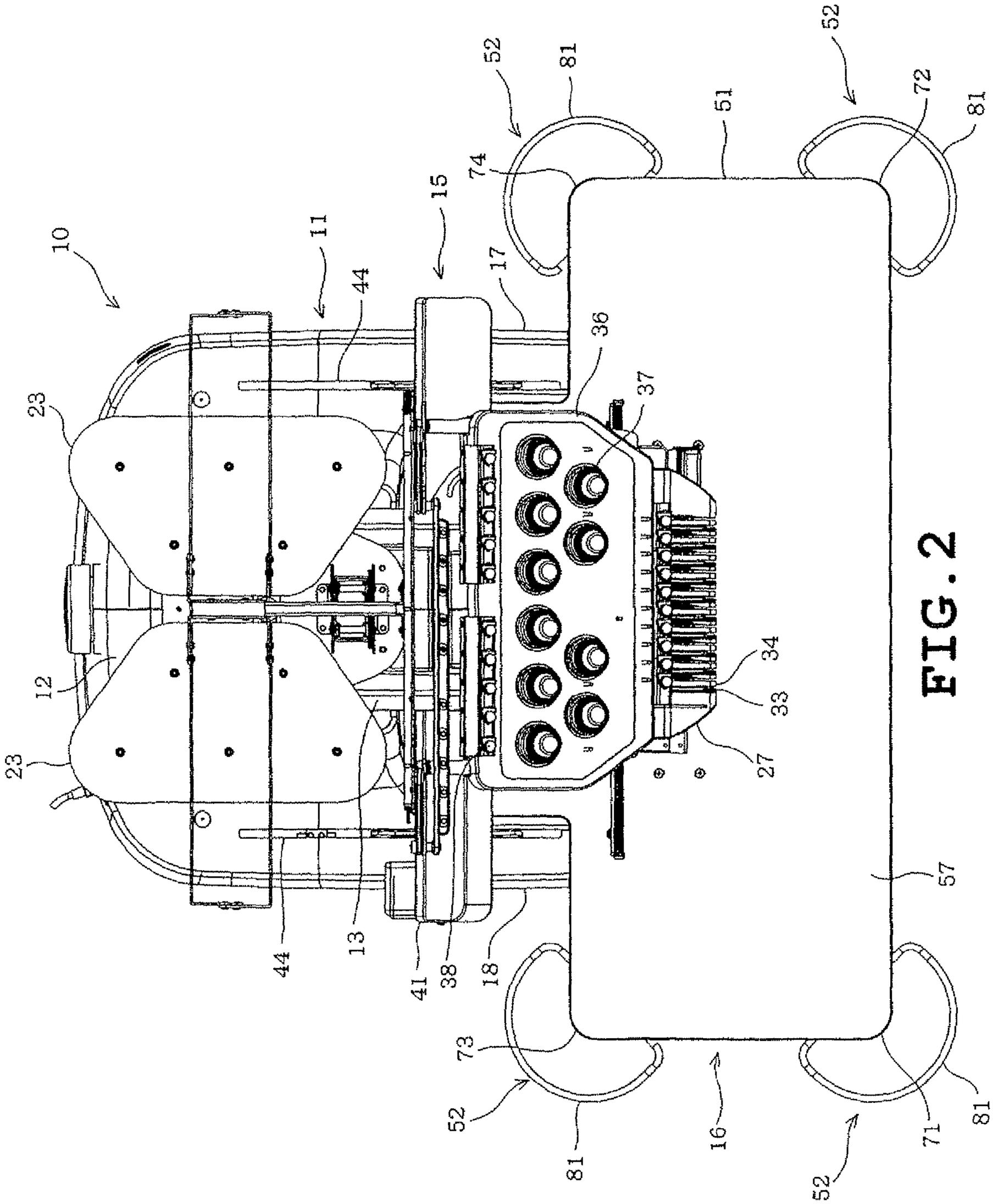
X
Y
18

FIG.1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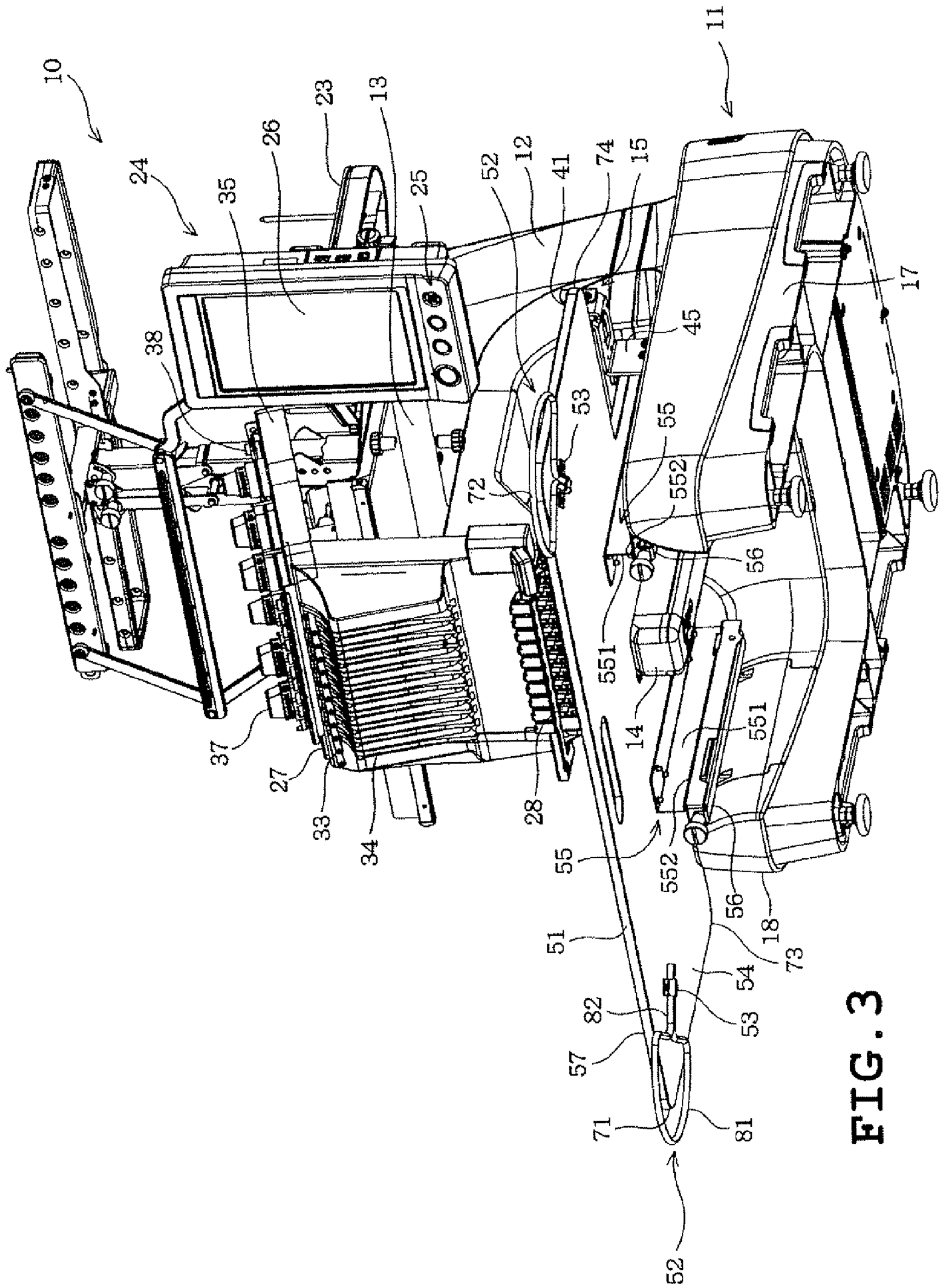
81

FIG. 2


10
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13
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552
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56
551
14
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28
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552
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18
73
51
54
82
53
57
71
81
52

FIG. 3

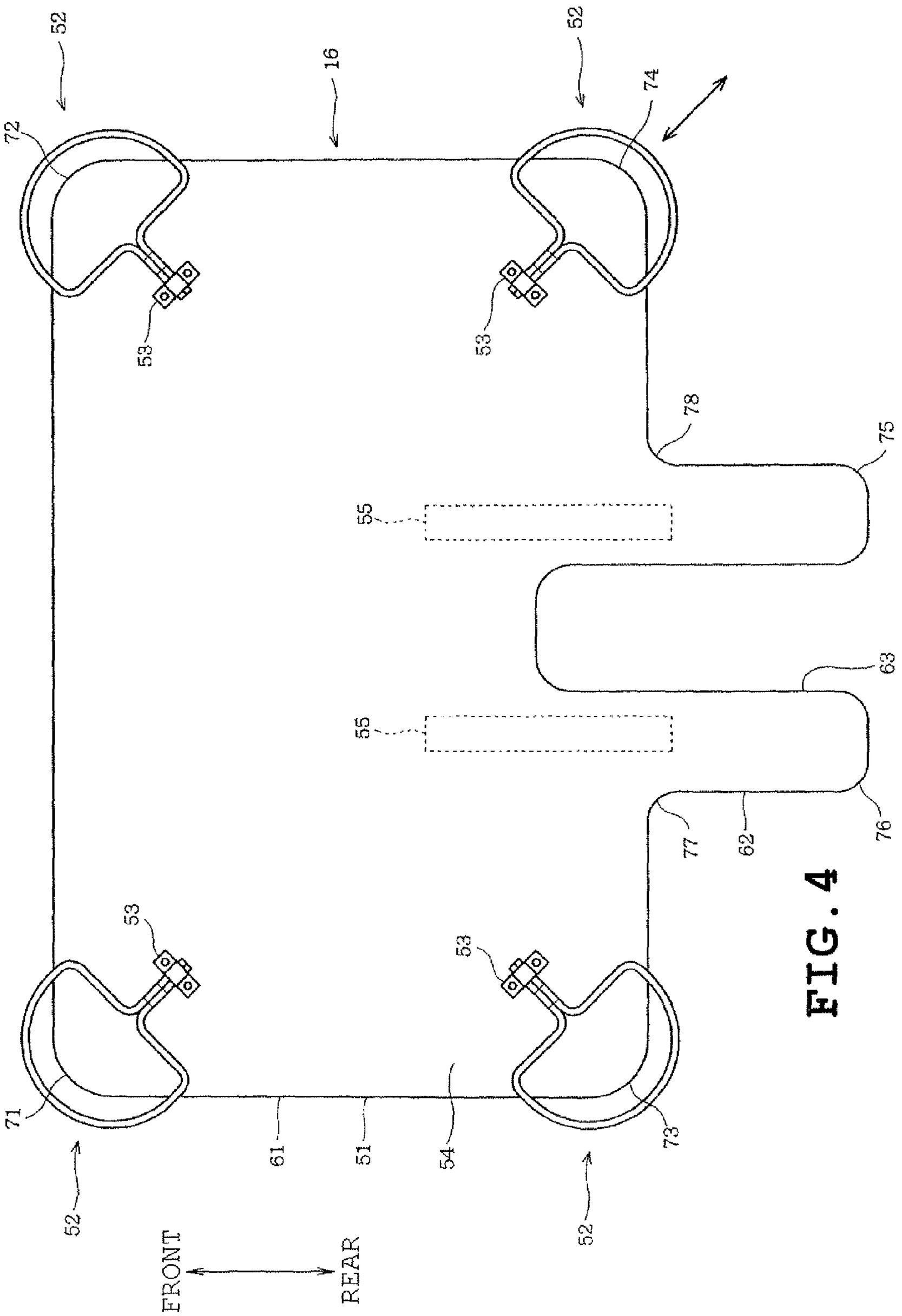

52
16
52
74
72
53
53
78
75
55
55
63
77
62
76
53
53
71
61
51
54
73
52
52
FRONT
REAR

FIG. 4

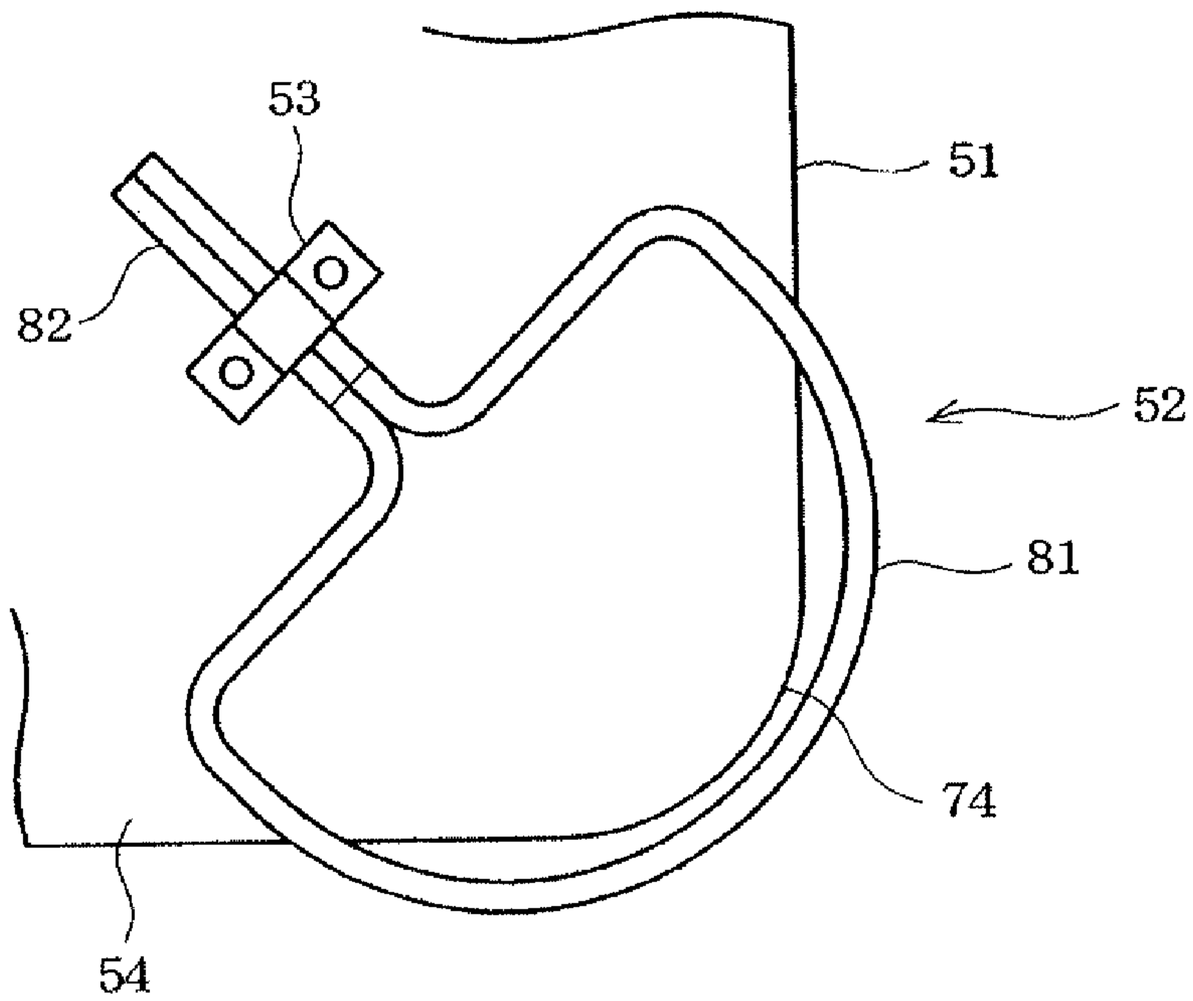


FIG. 5

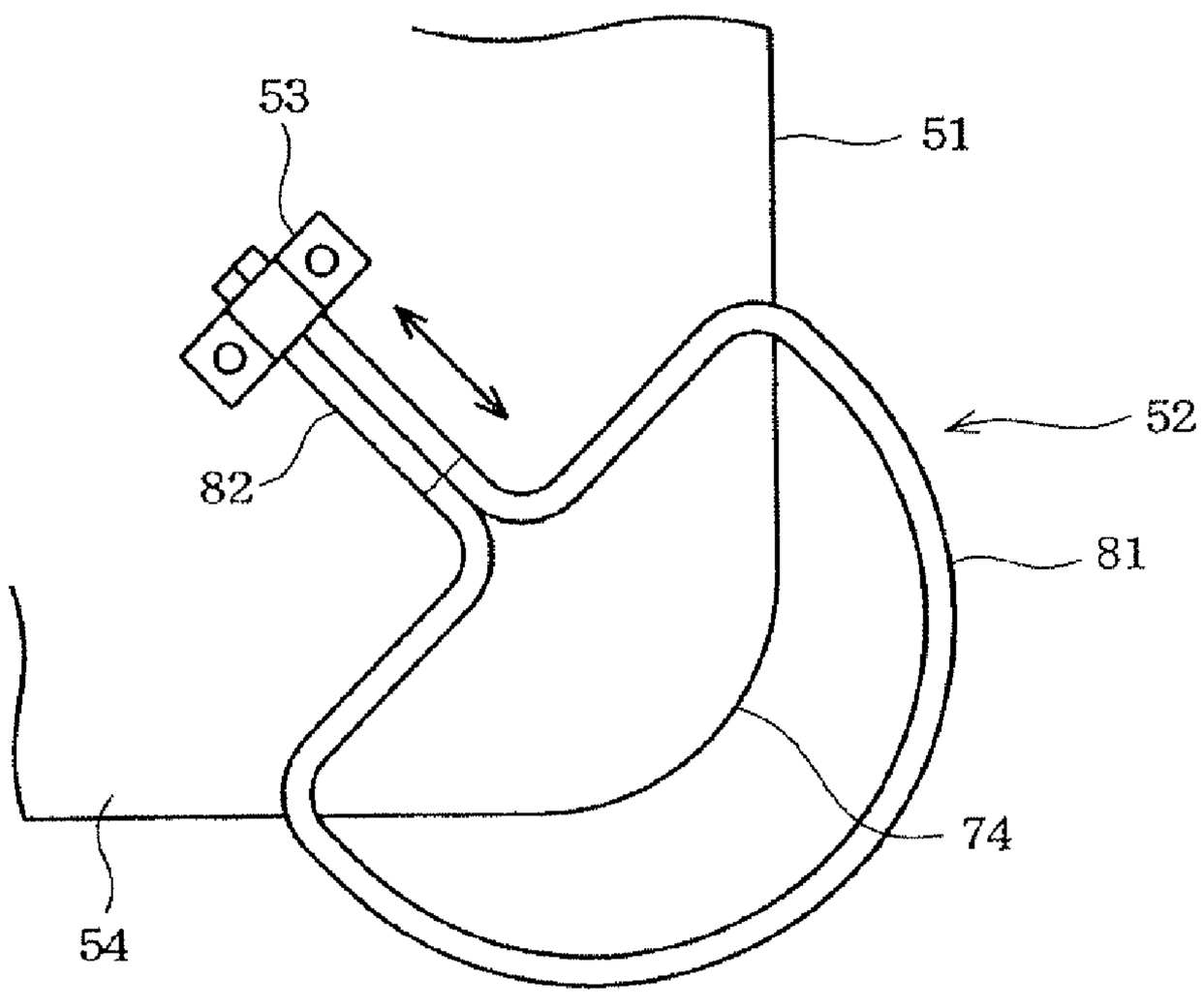


FIG. 6

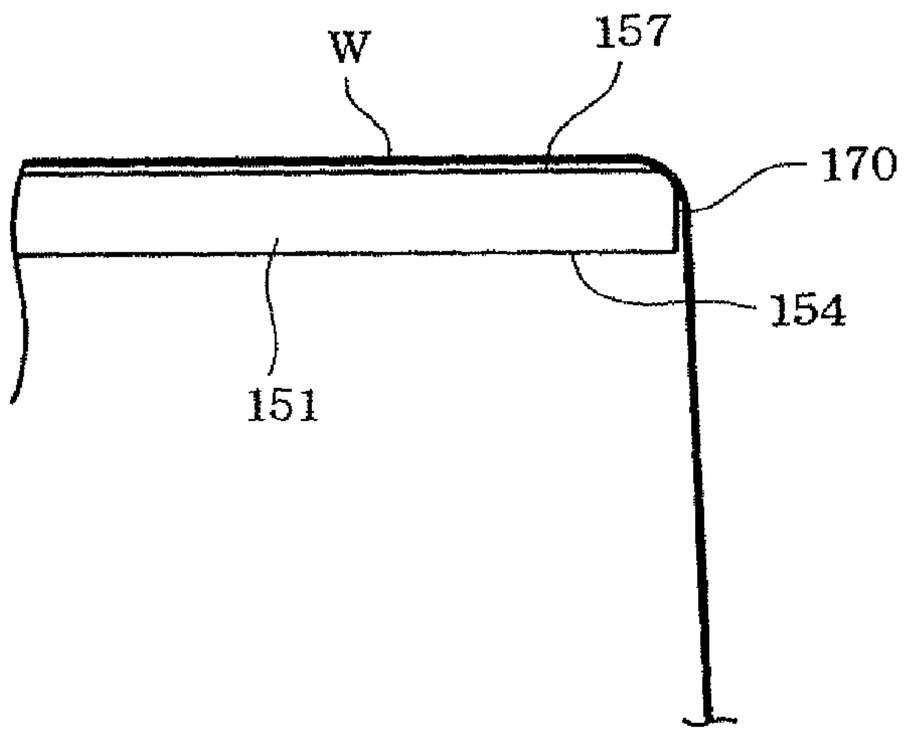


FIG. 7 RELATED ART

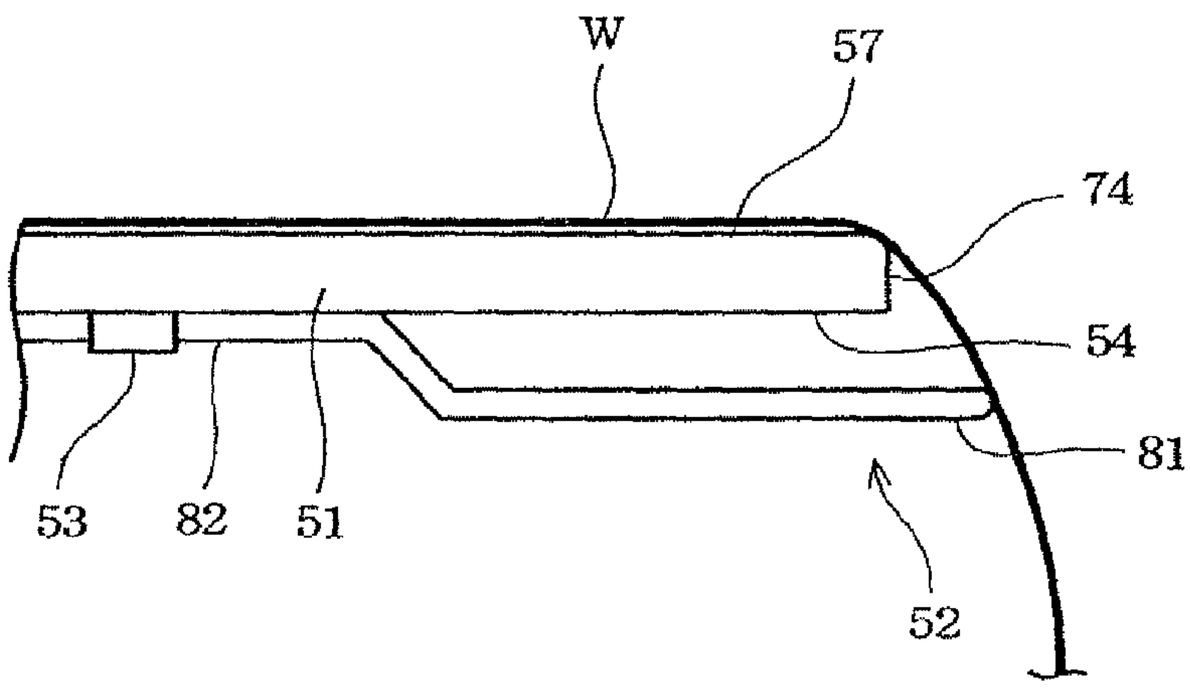


FIG. 8

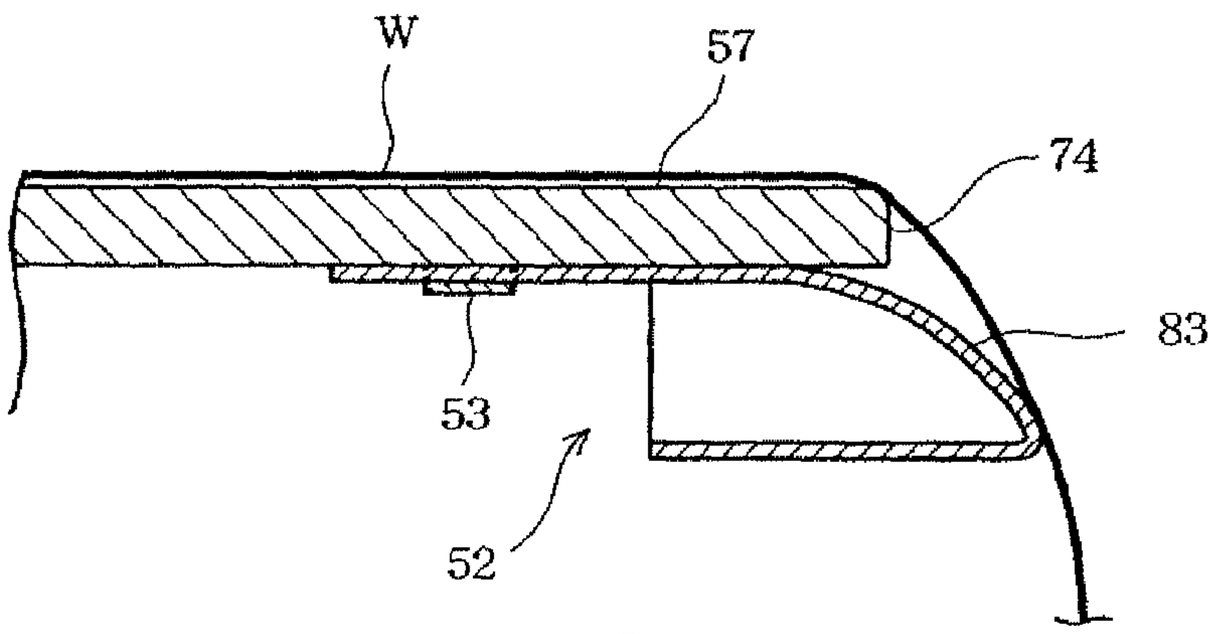


FIG. 9

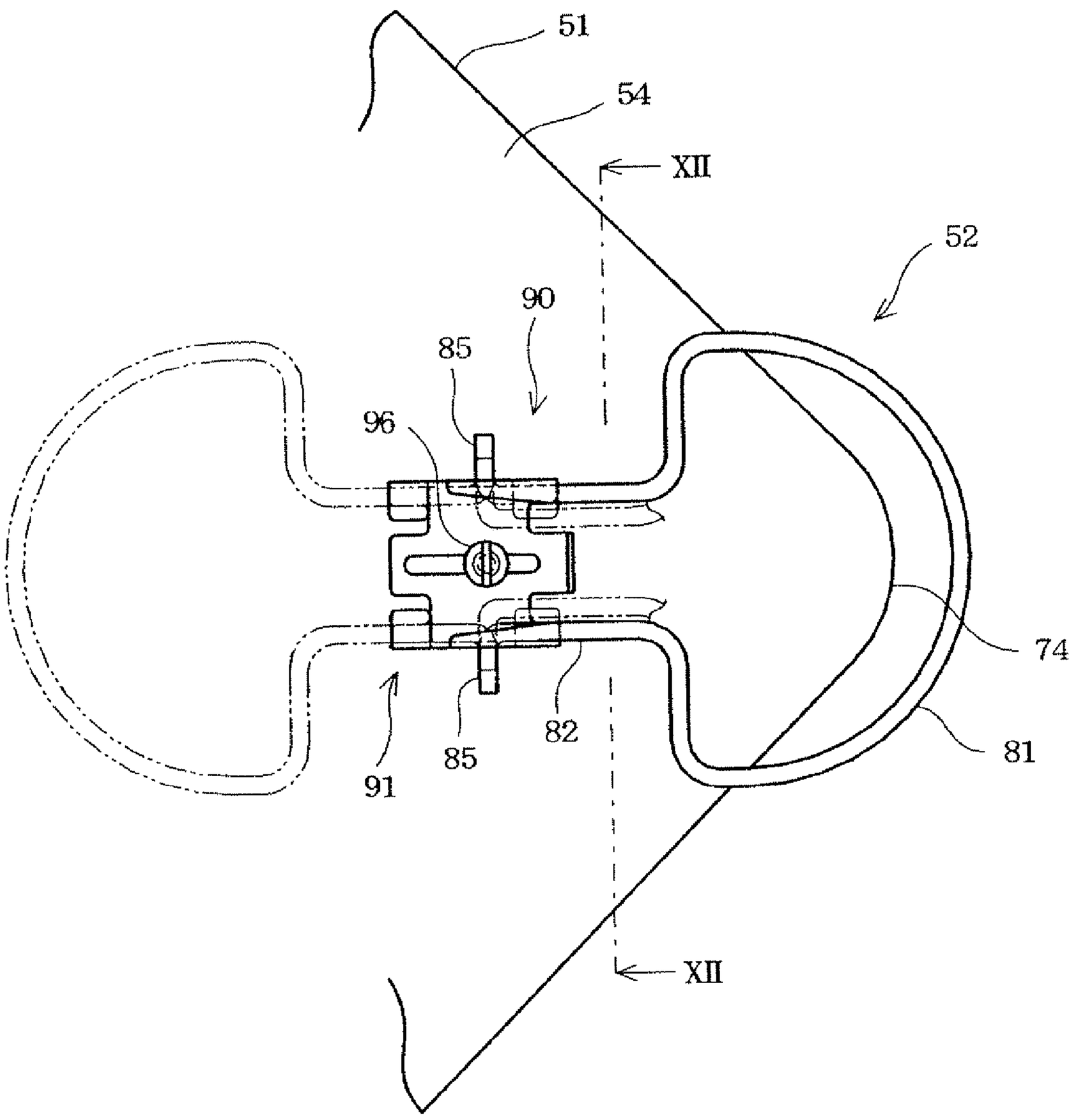
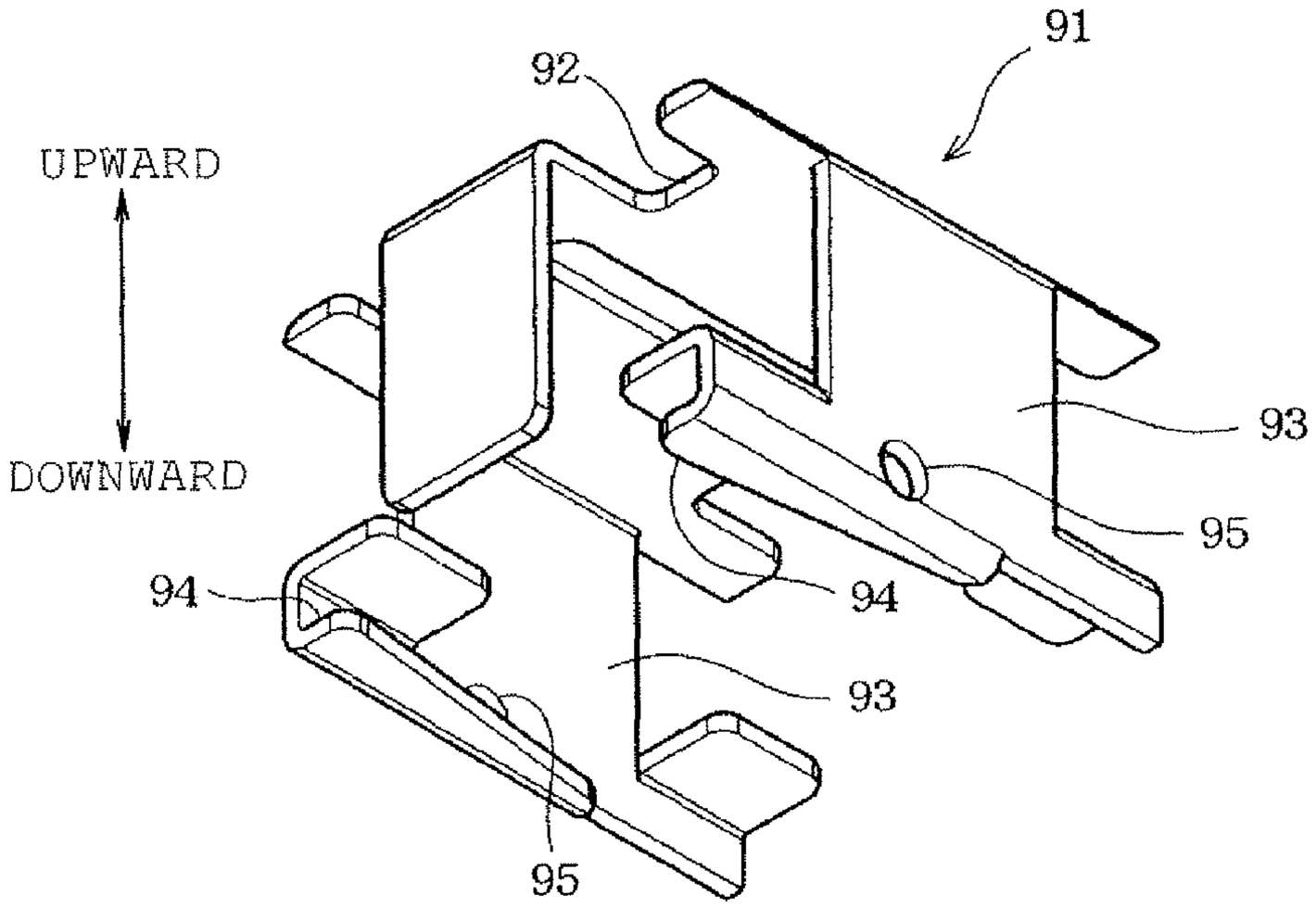


FIG.10


91
92
UPWARD
DOWNWARD
93
95
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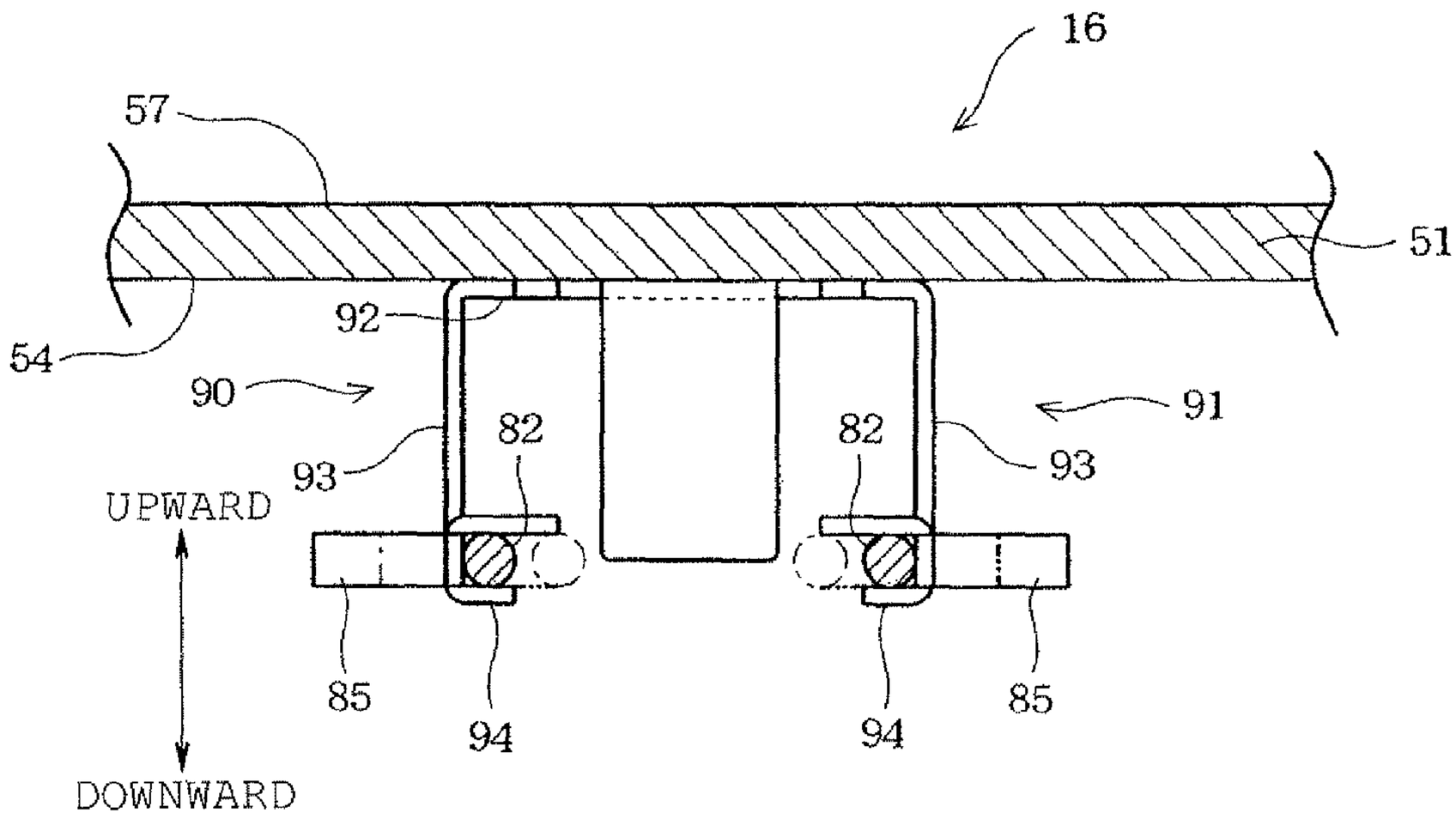
94
93
95

FIG.11


16
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90
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82
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UPWARD
DOWNWARD
85
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85

FIG.12

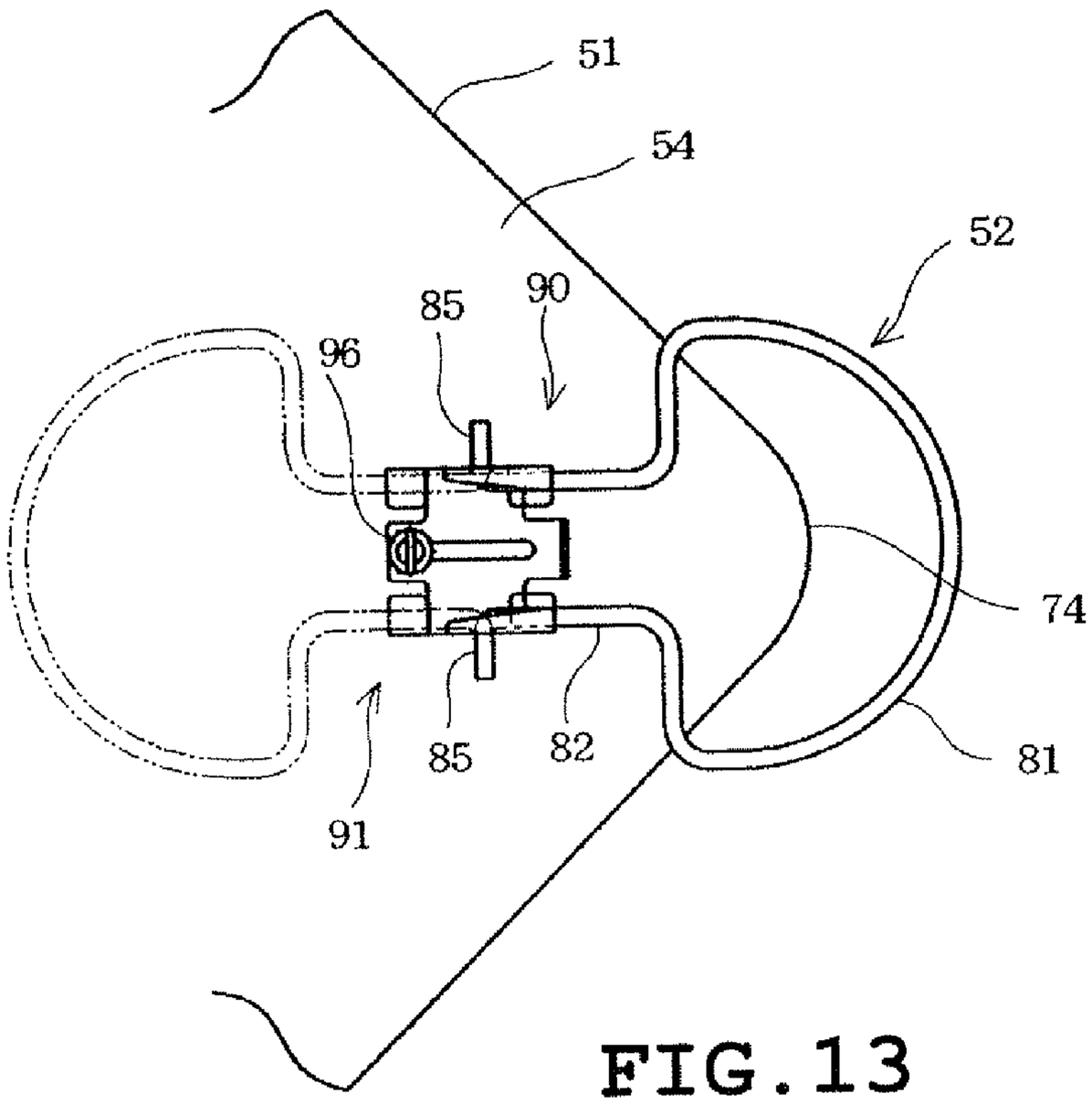

FIG.13

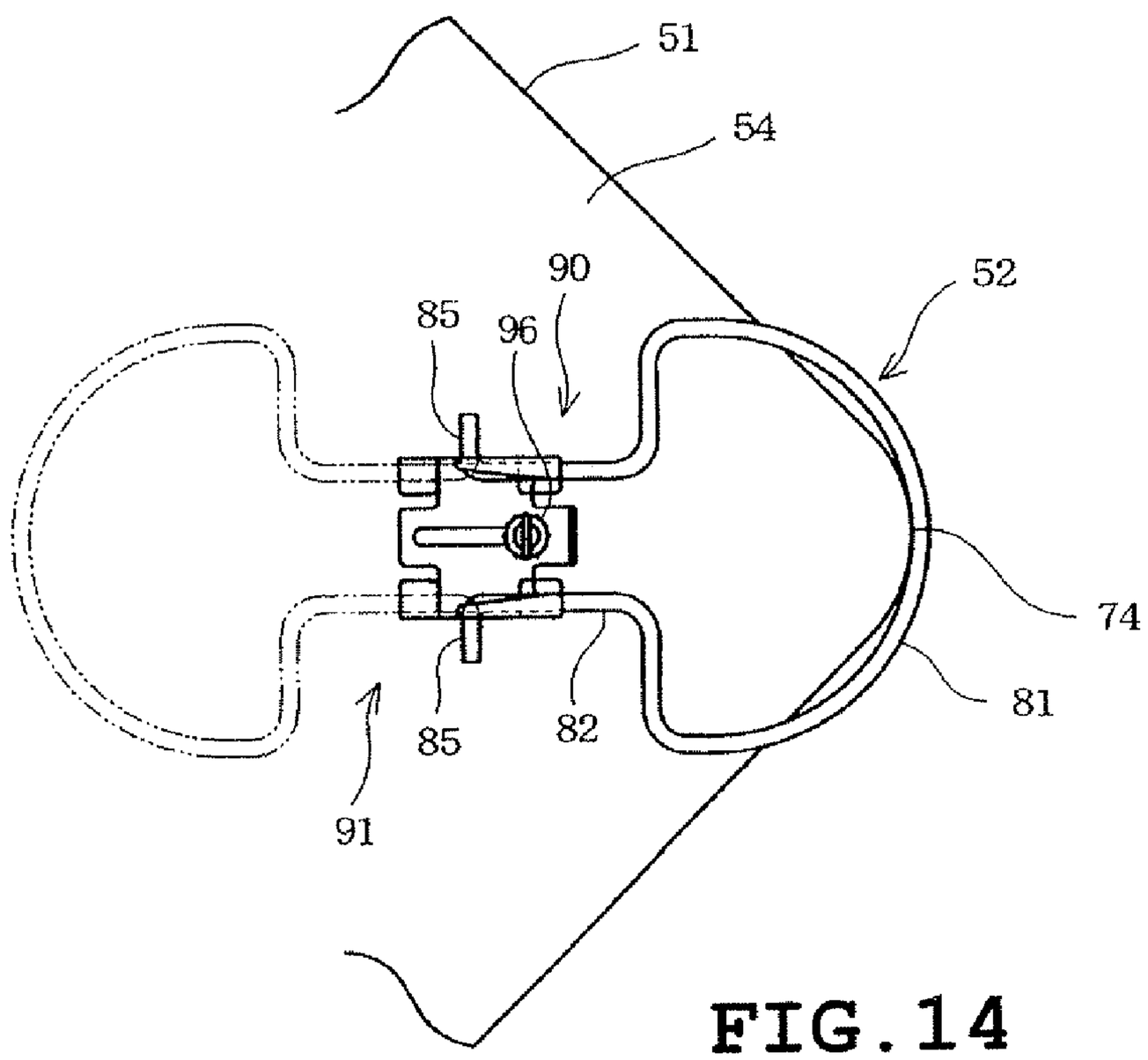

FIG.14

AUXILIARY TABLE FOR SEWING MACHINE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 2009-203573 filed on Sep. 3, 2009, the entire contents of which are incorporated herein by reference.

BACKGROUND

1. Technical Field

The present disclosure relates to an auxiliary table detachably attached to a sewing machine so that the auxiliary table is coplanar with a sewing bed of the sewing machine.

2. Related Art

For example, when an embroidery pattern is sewn on a large-sized workpiece cloth, such as working wears or stadium jackets, held on an embroidery frame attached to a sewing machine, ends of the workpiece cloth hang down from the embroidery frame. The hanging workpiece cloth tends to be easily caught by corners formed on a sewing machine bed or the like when moved with the embroidery frame for the embroidery pattern to be sewn. As a result, the embroidery frame and the workpiece cloth held on the embroidery frame are prevented from free movement. This would result in a reduction in quality of an embroidery pattern sewn on the workpiece cloth.

In view of the above-described problem, there has conventionally been disclosed a sewing machine table which can provide an easy handling of workpiece cloth thereby to improve the efficiency in an embroidery-sewing work. The disclosed sewing machine table includes a vertical wall surface enlarged into a tapered form so that a workpiece cloth is held on the tapered wall surface as well as on the upper surface of the embroidery frame, whereby the handling of the workpiece cloth can be improved. However, the above-described sewing machine table has a problem that the size thereof and in particular, the vertical dimension thereof are increased.

Furthermore, it is suggested that the size of a generally flat plate-like sewing machine table simply be increased for the purpose of increasing an area of the upper surface on which the workpiece cloth is placed in order that the workpiece cloth may be handled more easily. In this case, however, a larger installation space is necessitated for the sewing machine with the increase in the size of the sewing machine table.

SUMMARY

Therefore, an object of the disclosure is to provide an auxiliary table which can promote a smooth movement of the workpiece cloth and realize high efficient embroidery sewing.

The present disclosure provides an auxiliary table for a sewing machine which includes a sewing machine bed to which the auxiliary table is detachably attached so that a workpiece cloth can be placed thereon, the auxiliary table comprising a table body formed into a flat plate shape in a planar view and including one or a plurality of rectangular portions, the table body having a plurality of corners, an upper surface at an upper side in a direction of gravitational force and an underside at a lower side in the direction of gravitational force; a cloth-receiving member which is provided on at least one of the corners of the table body so as to be located lower than the upper surface of the table body, the cloth-receiving member supporting, from below, the workpiece cloth placed on the upper surface side of the table body and hanging downward from the table body, the cloth-receiving member protruding outward from an outer edge of the table body, the cloth-receiving member having a receiving portion having an outer edge which surrounds outer edges of the corners; and a supporting member which supports the cloth-receiving member so that an amount of protrusion of the cloth-receiving member is changeable.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. **1** is a schematic perspective view of a multi-needle embroidery sewing machine to which the auxiliary table in accordance with a first embodiment is applied;

FIG. **2** is a top plan view of the multi-needle embroidery sewing machine;

FIG. **3** is a perspective view of the multi-needle embroidery sewing machine as viewed from below;

FIG. **4** is a schematic diagram of the auxiliary table as viewed from below;

FIG. **5** is a schematic diagram of a cloth-receiving member located at a retreated position;

FIG. **6** is a schematic diagram of the cloth-receiving member located at the forward position;

FIG. **7** is a schematic diagram of a workpiece cloth placed on a conventional auxiliary table with no cloth-receiving member as viewed sideways;

FIG. **8** is a schematic diagram of the workpiece cloth placed on the auxiliary table as viewed sideways;

FIG. **9** is a schematic diagram of the workpiece cloth placed on the auxiliary table in accordance with a second embodiment as viewed sideways;

FIG. **10** is a partially enlarged schematic view of the auxiliary table in accordance with a third embodiment, showing the cloth-receiving member as viewed from below;

FIG. **11** is a schematic perspective view of the supporting member of the auxiliary table;

FIG. **12** is a sectional view taken along line XII-XII in FIG. **10**;

FIG. **13** is a schematic diagram of the cloth-receiving member located at the forward position; and

FIG. **14** is a schematic diagram of the cloth-receiving member located at the retreat position.

DETAILED DESCRIPTION

Several embodiments will be described with reference to the accompanying drawings. Identical or similar parts are labeled by the same reference numerals throughout the embodiments.

A first embodiment will now be described with reference to FIGS. **1** to **6** and **8**. FIGS. **1** and **2** illustrate a multineedle embroidery sewing machine **10** to which the auxiliary table in accordance with the first embodiment is applied. In the following description, the right-left direction of the sewing machine **10** is referred to as "X direction" and the front-back direction thereof is referred to as "Y direction."

The sewing machine **10** comprises a sewing machine bed **11** (hereinafter, referred to as "sewing bed"), a support pillar **12**, an arm **13**, a transfer mechanism **15** and an auxiliary table **16**. The sewing bed **11** is placed on a loading table (not shown). The support pillar **12** extends upward from a rear end of the sewing bed **11**. The arm **13** extends frontward from an upper end of the support pillar **12**. The sewing bed **11** has right and left legs **18** and **17** extending frontward. Thus, the sewing bed **11** is formed into a generally inverted U-shape and has an

open front. The sewing bed **11** includes a cylinder bed **14** which extends frontward from an inner central part of the inverted U-shape of the sewing bed **11**. The cylinder bed **14** is formed integrally with the sewing bed **11** and has a needle plate **21** provided on an upper part of the front end side. The needle plate **21** has a needle hole **22**. A thread capturing hook (not shown), a thread cutting mechanism, a picker and the like are accommodated in a front end side interior of the cylinder bed **14** although none of them are shown.

A spool holder **23** is provided above a rear end side of the arm **13**. A plurality of thread spools (not shown) is mounted on the spool holder **23**. An operation panel **24** is provided on the right side of the arm **13** and includes a plurality of operation switches **25**, and a liquid-crystal display **26**. Each operation switch **25** accepts various instructions, selection and input operations from the user. The liquid-crystal display **26** displays necessary messages and the like for the user. The operation panel **24** is eliminated in FIG. **2**.

The arm **13** has a distal end on which a needle-bar case **27** is mounted. The needle-bar case **27** is movable in the X direction or a right-left direction. A plurality of thread spools (not shown) is mounted to the spool holder **23**. The needle-bar case **27** is formed into the shape of a low-profile box having a larger longitudinal thickness than a horizontal thickness. A plurality of needle bars **28** is mounted in the needle-bar case **27** so as to be vertically movable. Ten needle bars **28** are mounted in the first embodiment. The needle bars **28** are biased upward by spring forces of respective coil springs (not shown). The needle bars **28** have lower ends which protrude downward from the lower end of the needle-bar case **27** respectively. Sewing needles **31** for embroidery sewing are changeably mounted to the lower ends of the needle bars **28** protruding out of the needle-bar case **27**.

Presser feet **32** for embroidery sewing are provided below the respective needle bars **28** so as to be vertically movable in synchronization with the vertical movement of the needle bars **28**. Furthermore, a plurality of needle thread take-up levers **33** are provided above the needle-bar case **27** so as to correspond to the needle bars **28** respectively. The needle thread take-up levers **33** have distal ends protruding forward through vertically extending slits **34** formed in the front side of the needle-bar case **27** respectively, whereby the needle thread take-up levers **33** are vertically swung in synchronization with the vertical movement of the needle bars **28** respectively.

The needle-bar case **27** includes an upper cover **36** which is formed integrally therewith and extends obliquely rearward from an upper end thereof. A plurality of thread tensioners corresponding to the respective needle bars **28** are provided on the upper cover **36**. A plurality of thread breakage sensors **38** corresponding to the respective needle bars **28** are also provided on an upper end of the upper cover **36**. In the first embodiment where the sewing machine **10** is provided with ten needle bars **28**, ten thread tensioners **37** and ten thread breakage sensors **38** are provided. As the result of the above-described construction, needle threads are drawn from respective thread spools set on the spool holder **23** and passed through respective thread break sensors **38**, thread tensioners **37**, thread take-up levers **33** and the like sequentially. The needle threads are finally passed through the eyes of the needles **9** respectively, whereupon the embroidery sewing is executable. In this case, when different colors of threads are supplied to ten needles **31**, an embroidery sewing operation can continuously be carried out using the needle threads of a plurality of colors while the threads are automatically changed.

A sewing machine motor (not shown) is accommodated in the support pillar **12**. In the arm **13** are provided a main shaft (not shown) driven by the sewing machine motor, a needle-bar vertical drive mechanism (not shown) which is driven by the sewing machine motor to vertically drive the needle bars **28**, a needle-bar selecting mechanism (not shown) moving the needle-bar case **27** in the X direction to select one of the needle bars **28**, and the like, as well known in the art. The thread capturing hook (not shown) is driven by the main shaft in synchronization with the vertical movement of the need bar **28**.

The needle-bar vertical drive mechanism has a vertically moving member (not shown) which is selectively engages a needle bar bracket (not shown) provided on each needle bar **28**. The needle-bar selecting mechanism moves the needle bar case **27** in the X direction with a needle-bar selecting motor serving as a drive source, thereby engaging the needle bar **28** located right above the needle hole **22** with the vertically moving member. As the result of this construction, the selecting single needle bar **28** and the needle thread take-up lever **33** corresponding to the selected needle bar **28** are vertically driven by the needle-bar vertical drive mechanism.

The transfer mechanism **15** is provided above the sewing bed **11** in front of the support pillar **12**. In the execution of embroidery sewing, an embroidery frame (not shown) holding a workpiece cloth on which embroidery sewing is to be executed is detachably attached to the transfer mechanism **15**. A plurality of embroidery frames are prepared and differ in the size and configuration.

The transfer mechanism **15** has a Y-direction carriage **41**, an X-direction carriage **42**, and a frame holder **43**. The X-direction carriage **42** is provided in the Y-direction carriage **41**. The frame holder **43** is provided on the X-direction carriage **42**. The transfer mechanism **15** includes a Y-direction drive mechanism and an X-direction drive mechanism. The Y-direction drive mechanism is accommodated inside the sewing bed **11** to drive the Y-direction carriage **17** in the Y direction or in the front-back direction. The X-direction drive mechanism is accommodated inside the Y-direction carriage and drives the X-direction carriage **42** and the frame holder **43** in the X direction or in the right-left direction. As a result, an embroidery frame attached to the frame holder **43** is freely transferred in two directions of X and Y by the transfer mechanism **15**.

The Y-direction carriage **41** is formed into the shape of a box extending in the right-left direction and located so as to straddle the legs **17** and **18** of the sewing bed **11**. The legs **17** and **18** have guide grooves **44** formed in upper portions respectively. The Y-direction drive mechanism (not shown) has a moving portion **45** which extends vertically through the guide groove **44** and is movable in the front-back direction along the guide groove **44**. The moving portion **45** has an upper end connected to both right and left ends of the Y-direction carriage **41**.

The Y-direction drive mechanism comprises a linear transfer mechanism including a Y-direction drive motor comprising a stepping motor, a timing pulley and a timing belt although none of which are shown. The moving portion **45** is moved in the front-back direction by the linear transfer mechanism with the Y-direction drive motor serving as a drive source so that the Y-direction carriage **41** is driven freely in the front-back direction.

The X-direction carriage **42** includes a part which protrudes frontward from below the front end side of the Y-direction carriage **41**, and is formed into the shape of a plate extending in the right-left direction. The X-direction carriage **42** is supported on the Y-direction carriage so as to be slidable

in the X direction. The X direction drive mechanism accommodated in the Y-direction carriage **41** comprises a linear transfer mechanism including an X-direction drive motor, a timing pulley and a timing belt although none of which are shown. The X-direction carriage **42** is freely driven in the right-left direction by the linear transfer mechanism with the X-direction drive motor serving as a drive source.

The auxiliary table **16** will now be described in detail. The auxiliary table **16** comprises a table body **51**, a cloth-receiving member **52** and a support member **53** as shown in FIG. **3**. The auxiliary table **16** is detachably attached to a part of the sewing machine located above the sewing bed **11** as shown in FIGS. **1** and **3**. The auxiliary table **16** has a pair of engagement portions **55** at the side of the underside **54** of the table body **51** as shown in FIG. **3**. The engagement portions **55** are adapted to engage a pair of guide members **56** provided on the legs **17** and **18** of the sewing bed **11** respectively. The engagement portions **55** have plate members **551** extending in the front-back direction and pins (not shown) protruding from the plate members **551** to the guide member side. The guide members **56** have grooves (not shown) that are formed inside so as to extend in the front-back direction, respectively. The pins are engaged with the grooves and guided by the grooves so as to be movable in the front-back direction respectively. As a result, the engagement portions **55** and the guide portions **56** are movable in the front-back direction relative to each other, and the auxiliary table **16** is also movable relative to the sewing bed **11**.

In attaching the auxiliary table **16** to the sewing machine **10**, the pins of the engagement portions **55** of the auxiliary table **16** are engaged with the respective grooves of the guide members **56**. The upper end of the auxiliary table **16** is lifted up with the pins in engagement with the respective grooves and then thrust rearward while the auxiliary table **16** is held substantially in parallel to the upper surface of the cylinder head **14**. When the pins in engagement with the respective grooves have reached the rear ends of the guide members **56**, the rearward movement thereof is limited. The auxiliary table **16** is held above the sewing bed **11** when stepped portions **552** of the guide members **56** are brought into contact with the upper surfaces of the guide members **56** respectively.

On the other hand, when the auxiliary table **16** is to be detached from the sewing machine **10**, the front end of the auxiliary table **16** is lightly lifted up so that the stepped portions **552** and the upper surface of the guide member are released from the engaged state. Thereafter, the auxiliary table **16** is drawn back frontward. In this case, the auxiliary table **16** is moved frontward while the pins are engaged with the grooves thereby to be guided by the grooves respectively. After the auxiliary table **16** has been returned to the frontward attachment position, the auxiliary table **16** lifted upward such that the pins and the grooves are disengaged from each other, whereupon the auxiliary table **16** is detached from the sewing machine **10**.

The table body **51** has the above-described underside **54** and an upper surface **57** located opposite the underside **54**. When the sewing machine **10** is mounted on the mounting (not shown), the upper surface **57** is directed upward in the direction of gravitational force and the underside **54** thereof is directed downward in the direction of gravitational force. The table body **51** is formed into the shape of a plate comprising a single rectangular portion or a combination of a plurality of rectangular portions. In the embodiment, as shown in FIG. **4**, the table body **51** has a large rectangular baseplate **61** and a rectangular insertion portion **62** protruding rearward from the baseplate **61**. The insertion portion **62** has a notch **63** which is formed in a middle part of the rear side of the table body **51** so as to extend from the rear side toward the front side. The cylinder bed **14** is inserted into the notch **63**. The table body **51** is thus formed by combining the plural rectangular portions. Accordingly, the auxiliary table **16** has a plurality of corners **71**, **72**, **73**, **74** **75**, **76**, **77** and **78** in outer edges thereof. The corners **71** to **76** are external corners which are directed outward, and the other corners **77** and **78** are inside corners which are directed inward. Each of the corners **71** to **78** has am outer edge which is chamfered into an arc shape.

Cloth-receiving members **52** are provided on the corners **71** to **74** respectively. In the embodiment, the cloth-receiving members **52** are disposed on the corners **71** to **74** which are external corners. Each cloth-receiving corner **52** is located lower than the upper surface **57** of the table body **51** in the direction of gravitational force. The cloth-receiving members **52** are supported by supporting members **53** at the side of the underside of the table body **51** respectively. As a result, the cloth-receiving members **52** are located below the underside **54** of the table body **51** in the embodiment. Each cloth-receiving member **52** has a receiving portion **81** and a base **82** as shown in FIG. **5**. The receiving portions **81** are formed so that outer edges thereof surround outer edges of the corners **71** to **74** respectively, as viewed in a planar view. FIGS. **5** and **6** exemplify the corner **74** for the sake of easiness in the explanation. The receiving portions **81** are formed into the shape of an arc larger than radii of the chamfered corners **71** to **74** respectively. Each cloth-receiving member **52** includes the receiving portion **81** and the base **82** both of which are integrally formed of a wire rod, in the embodiment. The wire rod has a substantially circular section.

The support members **53** are provided on the underside **54** of the table body **51** to support the above-described cloth-receiving members **52** respectively so that amounts of protrusion of the receiving portions **81** from the outer edges of the table body **51** are changeable respectively. More specifically, the bases **82** of the cloth-receiving members **52** are supported by the support members **53** and movable radially with respect to the corners **71** to **74**, respectively. Consequently, the receiving portions **81** integrally formed with the bases **82** are movable radially with respect to the corners **71** to **74**, whereupon amounts of protrusion of the receiving portions **81** are changeable into arbitrary values, respectively, as shown in FIGS. **5** and **6**.

The auxiliary table **16** described above will work as follows. The auxiliary table **16** is provided with the cloth-receiving members **52** located particularly at the corners **71** to **74** forming the external corners on the underside of the table body **51** respectively, as shown in FIGS. **1** to **4**. The cloth-receiving members **52** have the receiving portions **81** protruding outside the corners **71** to **74** of the table body **51** or more specifically, protruding radially outside the corners **71** to **74**, respectively.

In the conventional construction, the workpiece cloth W is placed on the upper surface **157** side of the table body **151** as shown in FIG. **7**. When the workpiece cloth W is larger than the area of the table body **151**, part of the workpiece cloth W running over the table body **151** hangs downward. In this case, the overrunning part of the workpiece cloth W hangs substantially vertically downward from a corner **170** of the table body **151**. Accordingly, the friction caused between the table body **151** and the workpiece cloth W is increased in part of the workpiece cloth W in contact with the corner **170** of the table body **151**. As a result, the workpiece cloth W placed on the table body **151** tends to be easily caught on the corner **170** of the table body **151**.

On the other hand, the workpiece cloth W placed on the upper surface of the table body **51** is pushed thereby to be

spread outward when the receiving portion **81** protruding out of the outer edge of the corner **74** is provided below the table **51** in the embodiment as shown in FIG. **8**. As a result, the workpiece cloth W is bent thereby to be divided into a part running over the table body **51** and another part placed on the upper surface **57** of the table body **51**. Since a bending angle in this case is an obtuse angle that is larger than 90 degrees, the friction caused between the table body **151** and the workpiece cloth W is reduced in part of the workpiece cloth W in contact with the corner **170** of the table body **151** as compared with the conventional construction in FIG. **7**. Consequently, the workpiece cloth W placed on the table body **51** can be moved smoothly along the upper surface **56** side of the table body **51** without being caught on the corner **74** of the table body **51**. Although only one corner **74** is shown in FIG. **8** for the sake of easiness in the description, the foregoing description can also be applied to the other corners **71** to **73**.

The following effect can be achieved from the above-described auxiliary table **16**. The workpiece cloth W running over the table body **51** thereby to hang downward is supported by the cloth-receiving member **52** below the corners **71** to **74** of the table body **51**. Accordingly, the cloth-receiving member **52** supports the workpiece cloth W outside the outer edge of the table body **51**. As a result, the workpiece cloth W is bent thereby to be divided into the part placed on the upper surface **57** of the table body **51** and the part hanging downward from the table body **51**. The bending angle in this case is an obtuse angle. Furthermore, an amount of outward protrusion of the workpiece cloth W from each of the outer edges of the corners **71-74** of the table body **51** can be changed by the support member **53** of the cloth-receiving member **52**. This results in an optionally adjustable angle made by the part of the workpiece cloth W placed on the upper surface **57** of the table body **51** and the part hanging downward from the table body **51**. Consequently, when the workpiece cloth W is moved along the upper surface **57** of the table body **51**, the workpiece cloth W hanging downward from the table body **51** is smoothly moved without being caught on the corners **71-74** of the table body **51**. Thus, a smooth movement of the workpiece cloth W can be achieved without increasing the size of the table body **51** even when the workpiece cloth W is large in size. Furthermore, when embroidery sewing is to be executed by the use of the sewing machine **10**, an embroidery pattern with high accuracy can be sewn by ensuring smooth movement of the workpiece cloth W.

The receiving portions **81** of the cloth-receiving members **52** are formed so as to surround the outer edges of the corners **71-74** in a planar view respectively. Accordingly, the hanging part of the workpiece cloth W is pushed thereby to be spread large such that a larger angle is made between the part of the workpiece cloth W placed on the upper surface **57** of the table body **58** and the hanging part. Consequently, in moving the workpiece cloth W along the upper surface **57** of the table body **51**, the part of the workpiece cloth W hanging downward from the table body **51** is moved smoothly without being caught by the corners **71** to **74** of the table body **51**. Accordingly, even when large in size, the workpiece cloth W can smoothly be moved.

The cloth-receiving portions **81** are formed into the shape of an arc equal to or larger than radii of the corners **71** to **74** on which the workpiece cloth W easily tends to be caught, respectively. Accordingly, since the part of the workpiece cloth W located below the table body **51** is spread outward, a smooth movement of the workpiece cloth W can be ensured.

The bases **82** of the cloth-receiving members **52** are supported by the support members **52** so as to be movable radially with respect to the corners **71-74**, respectively. Accordingly, amounts of outward movement from the outer edges of the table body **51** can be changed to optional values by the cloth-receiving members **52** respectively. As a result, an amount of protrusion of each cloth-receiving member **52** protruding from the outer edge of the table body **51** is changed by the change of the size of the workpiece cloth, the material, the weight of the workpiece cloth W or the like. Thus, since the workpiece cloth W can be supported at an optimum position according thereto, a smooth movement of the workpiece cloth W can be ensured.

Each cloth-receiving member **52** is formed of the wire rod having a substantially circular section. Thus, each cloth-receiving member **52** has a surface having a curved shape. As a result, the workpiece cloth W tends to be easily slid on the surface of each cloth-receiving member **52**. Furthermore, each cloth-receiving member **52** can be rendered lightweight when formed of the wire rod.

FIG. **9** illustrates one of the cloth-receiving members of the auxiliary table in accordance with a second embodiment. In the second embodiment, each cloth-receiving member **52** includes a receiving portion **83** that is formed into a partially spherical shape as shown in FIG. **9**. More specifically, each cloth-receiving member **52** is formed of the wire rod into a planar arc shape in the first embodiment. On the other hand, in the second embodiment, each cloth-receiving member **52** includes a receiving portion **83** that is formed into a stereoscopic inverted bowl shape. One of the corners **71-74**, that is, the corner **74** will be described in the second embodiment, too. Furthermore, in the second embodiment, the workpiece cloth W includes the portion placed on the upper surface **57** and the portion hanging downward from the corner **74**. The bending angle made by these portions is an obtuse angle in the same manner as in the first embodiment. Furthermore, when each receiving portion **83** is formed into the partially spherical shape, the portion of the workpiece cloth W hanging downward from the table body **51** is smoothly moved while guided by the spherical receiving portion **83**. Accordingly, the workpiece cloth W can smoothly be moved without rendering the table body **51** large-sized even when the workpiece cloth W is large in size.

FIG. **10** illustrates a third embodiment. In the third embodiment, the auxiliary table **16** is provided with a switching mechanism **90** as shown in FIG. **10**. One of the corners **71-74**, that is, the corner **74** will be described in the third embodiment, too. The switching mechanism **90** switches the cloth-receiving member **52** between a support position as shown by solid line in FIG. **10** and a retreat position as shown by broken line in FIG. **10**. When the cloth-receiving member **52** is located at the support position, the cloth-receiving member **52** protrudes outward from the outer edge of the corner **74** of the cloth-receiving member **52** as shown by solid line in FIG. **10**. When the cloth-receiving member **52** is located at the retreat position, the cloth-receiving member **52** is retreated inside the outer edge of the corner **74** as shown by broken line in FIG. **10**. The switching mechanism **90** comprises a support member **91** supporting the base **82** of the cloth-receiving member **52**. The support member **91** has a pedestal **92**, two walls **93** opposed to each other and two flanges **94**. The pedestal **92** is adjacent to the table body **51** when attached to the table body **51**. The walls **93** extend from both ends of the pedestal **92** toward the side opposed to the table body **51**, that is, downward. The flanges **94** are provided on the walls **93** which have ends opposed to the pedestal **92** respectively and from which the flanges **94** protrude inward or to the opposed other wall **93** side.

Each base **82** has an end which is located at the side opposed to the cloth-receiving portion **81**, as shown in FIG.

10. The end of each base **82** has a protrusion **85** protruding outward substantially perpendicular to the base **82**. The protrusion **85** is formed integrally with the cloth-receiving portion **81** and the base **82** from a single wire rod. The support member **91** has shaft supports **95** which are formed through the walls **93** and support the protrusions **85** so that the protrusions **85** are rotatable, respectively.

When each cloth-receiving member **52** is located at the support position, a lower end of the base **82** thereof is in contact with the flange **94**, as shown in FIG. **12**. This limits the rotational transfer of each cloth-receiving member **52** to the side opposed to the table base **51** about the protrusion **85** supported on the shaft support **95** or downward. Furthermore, when no force is applied to the base **82** of each cloth-receiving member **52**, the base **82** is pressed against the wall **93** side by the elastic force thereof. Accordingly, the base **82** and the flange **94** are not released from the contact therebetween.

On the other hand, the base **82** of each cloth-receiving member **52** is inwardly flexed by application of a force to the inside of the base **82** formed of the wire rod as shown by broken line in FIG. **12**. The base **82** and the flange **94** are released from the contact therebetween by flexing the base **82** so that the base **82** is located on the inside of the flange **94**. As a result, the base **82** is passed through the inside of the opposed flange **94** thereby to be rotatable about the shaft support **95**. Thus, when a force is applied to each base **82** so that the base **82** and the flange **94** are released from the contact, each cloth-receiving member is rotatable about the shaft support **95**, whereupon the cloth-receiving member **52** can be switched between the support position and the retreat position.

The pedestal **92** of the support member **91** is mounted on the table body **51** by a fixing member **96** such as a fixing screw as shown in FIG. **10**. When the fixing member **96** is loosened, the support member **91** is movable in a radial direction of the corner **74**. The support member **91** is fixed to the table body **51** when the fixing member **96** is tightened up. When the fixing member **96** is loosened, the support member **91** is movable between a maximum protrusion support position and a minimum protrusion support position. When located at the maximum protrusion support position, the support member **91** comes close to the corner **74**, and the receiving portion **81** is moved away from the corner **74**, as shown in FIG. **13**. When located at the minimum protrusion support position, the support member **91** is moved away from the distal end of the corner **74**, and the receiving portion **81** comes close to the corner **74**, as shown in FIG. **14**. The fixing member **96** is tightened up at any position so that positions of the support member **91** and the table body **51** or an amount of protrusion of the bearing member **81** is determined. Thus, since the support member **91** is movable in the axial direction of the corner **74**, the receiving portion **81** can optionally change the amount of protrusion of the corner **74** from the outer edge as shown in FIGS. **13** and **14**.

In the third embodiment, the cloth-receiving member **52** is switched between the support position and the retreat position. Accordingly, in the case where the cloth-receiving member is not necessary or where a small-sized workpiece cloth W is sewn, the cloth-receiving member **52** is switched to the retreat position located on the inside of the outer edge of the table body **51**. On the other hand, when a large-sized workpiece cloth W is sewn, the cloth-receiving member **52** is switched to the support position located on the outside of the outer edge of the table body **25**. The cloth-receiving member **52** is thus switched to the use or non-use position according to the size and shape of the workpiece cloth W serving as an object to be sewn. Accordingly, the handling of the sewing machine can be rendered easier.

The foregoing embodiments should not be restrictive but may be modified as follows. The cloth-receiving member **52** is provided on the underside of the table body **51** in the foregoing embodiments. However, when having a relatively larger thickness, the cloth-receiving member **52** may be provided between the upper surface **57** and the underside **54** of the table body **51**. In this case, an inwardly recessed accommodation hole may be formed in a sidewall of the corner **74** of the table body **51**. The cloth-receiving member **52** may be provided so as to be movable into and out of the accommodation hole. Thus, the cloth-receiving member **52** is located lower than the upper surface of the table body **51**. Accordingly, a part of the workpiece cloth W placed on the upper surface **57** and a part of the workpiece cloth hanging downward from the table body **51** are bent, and a bending angle therebetween can be rendered obtuse. Consequently, the catch of the workpiece cloth W on the corners **74** can be reduced such that the workpiece cloth W can smoothly be moved.

The foregoing description and drawings are merely illustrative of the present disclosure and are not to be construed in a limiting sense. Various changes and modifications will become apparent to those of ordinary skill in the art. All such changes and modifications are seen to fall within the scope of the appended claims.

What is claimed is:

1. An auxiliary table for a sewing machine which includes a sewing machine bed to which the auxiliary table is detachably attached so that a workpiece cloth can be placed thereon, the auxiliary table comprising:

a table body formed into a flat plate shape in a planar view and including one or a plurality of rectangular portions, the table body having a plurality of corners, an upper surface at an upper side in a direction of gravitational force and an underside at a lower side in the direction of gravitational force;

a cloth-receiving member which is provided on at least one of the corners of the table body so as to be located lower than the upper surface of the table body, the cloth-receiving member being configured to support, from below, the workpiece cloth when it is placed on the upper surface side of the table body and hanging downward from the table body, the cloth-receiving member protruding outward from an outer edge of the table body, the cloth-receiving member having a receiving portion having an outer edge which surrounds outer edges of the corners; and

a supporting member which supports the cloth-receiving member so that an amount of protrusion of the cloth-receiving member is changeable.

2. The auxiliary table according to claim **1**, wherein the receiving portion is formed into an arc shape and is equal to or larger than a radius of each corner.

3. The auxiliary table according to claim **1**, wherein the cloth-receiving member has an end which is located opposite the receiving portion and has a base, and the supporting member is provided on the underside of the table body and supports the base so that the cloth-receiving member is movable outward from an outer edge of the table body.

4. The auxiliary table according to claim **2**, wherein the cloth-receiving member has an end which is located opposite the receiving portion and has a base, and the supporting member is provided on the underside of the table body and supports the base so that the cloth-receiving member is movable outward from an outer edge of the table body.

5. The auxiliary table according to claim 1, wherein the cloth-receiving member is made of a wire rod.

6. The auxiliary table according to claim 1, further comprising a switching mechanism which switches the cloth-receiving member between a supporting position where the cloth-receiving member protrudes outward from an outer edge of the table body and a retreat position where the cloth-receiving member is retreated inside the outer edge of the table body.

7. An auxiliary table for a sewing machine which includes a sewing machine bed to which the auxiliary table is detachably attached so that a workpiece cloth can be placed thereon, the auxiliary table comprising:

a table body formed into a flat plate shape in a planar view and including one or a plurality of rectangular portions, for the table body having a plurality of corners, an upper surface at an upper side in a direction of gravitational force and an underside at a lower side in the direction of gravitational force;

a cloth-receiving member which is provided on at least one of the corners of the table body so as to be located lower than the upper surface of the table body, the cloth-receiving member being configured to support, from below, the workpiece cloth when it is placed on the upper surface side of the table body and hanging downward from the table body, the cloth-receiving member protruding beyond an outer edge of the table body in a direction substantially parallel to the table body; and

a supporting member which supports the cloth-receiving member so that an amount of protrusion from the cloth-receiving member is changeable.

8. The auxiliary table according to claim 7, wherein the cloth-receiving member having a receiving portion having an outer edge which surrounds outer edges of the corners.

9. The auxiliary table according to claim 7, wherein the cloth-receiving member is made of a wire rod.

10. The auxiliary table according to claim 7, further comprising a switching mechanism which switches the cloth-receiving member between a supporting position where the cloth-receiving member protrudes outward from an outer edge of the table body and a retreat position where the cloth-receiving member is retreated inside the outer edge of the table body.

11. The auxiliary table according to claim 8, wherein the receiving portion is formed into an arc shape and is equal to or larger than a radius of each corner.

12. The auxiliary table according to claim 8, wherein the cloth-receiving member has an end which is located opposite the receiving portion and has a base, and the supporting member is provided on the underside of the table body and supports the base so that the cloth-receiving member is movable outward from an outer edge of the table body.

13. The auxiliary table according to claim 11, wherein the cloth-receiving member has an end which is located opposite the receiving portion and has a base, and the supporting member is provided on the underside of the table body and supports the base so that the cloth-receiving member is movable outward from an outer edge of the table body.

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